UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P O Box 1450
Alexandria, Virginia 22313-1450
www uspto gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/804,754	03/19/2004	Igor V. Belousov	085.10989-US(03-502)	7681

34704 7590 07/16/2008
BACHMAN & LAPOINTE, P.C.
900 CHAPEL STREET
SUITE 1201
NEW HAVEN, CT 06510

EXAMINER	
BAND, MICHAEL A	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
07/16/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/804,754	BELOUSOV ET AL.	
	Examiner	**Art Unit**	
	MICHAEL BAND	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 April 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24,26 and 27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-23,26 and 27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/15/2008*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 26 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claim 26 has the limitation of a chamber pressure of less than 0.01 Pa. There is no support for this specific range in the specification.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-5, 7, 10-16, 19, 21-22 and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Bergmann et al (US Patent No. 4,992,153).

With respect to claim 1, Bergmann et al discloses a sputter-CVD process for coating a workpiece [42] in a chamber [2] by a sputter target (i.e. second component)

[31] and an evaporation crucible (i.e. first component) [9] (abstract; fig. 1). Bergmann et al further discloses the sputtered and evaporated material being co-deposited during the sputter-CVD coating process (col. 5, lines 26-34). Bergmann et al discloses co-depositing material from a crucible (first component) and a sputter target (second component). To sputter, a plasma is formed from a gas inlet [10]. The gas inlet [10] is approximately in-between the crucible [9] and sputter target [31] (fig. 1). Titanium ions are evaporated from the crucible [9] (col. 4, lines 57-58). It is inherent that some of the evaporated titanium ions will be absorbed into the plasma from gas inlet [10]. The plasma, and therefore titanium ions, is then used to sputter from the target [31]. Thus ions from the crucible (first component) [9] are used to sputter the target (second component) [31]. In addition, Bergmann et al discusses how for coating, the workpieces [42] are conductively attached to a turntable [43], with said turntable attached to a voltage source [52] (col. 3, lines 50-60; col. 4, lines 23-24).

With respect to claim 2, Bergmann et al further depicts in fig. 1 the sputter target [31] attached to a voltage source [36].

With respect to claim 3, Bergmann et al further depicts in fig. 1 an evaporation crucible [9] and a sputter target [31]. As material evaporates out of the crucible towards workpiece surface [57], it is expected that part of said material (i.e. an ion flowpath) will cross into the sputter ion path by diffusion principles. Thus, the sputtering target encircles an ion flowpath from the evaporation crucible.

With respect to claim 4, Bergmann et al further discloses the sputter target (i.e. second component) is made of tungsten (col. 6, lines 15-21).

With respect to claim 5, Bergmann et al further discloses that the sputter target can be tungsten in addition to also being of the chemical group VIa (i.e. chromium, molybdenum, and tungsten) (col. 6, lines 15-21).

With respect to claim 7, Bergmann et al further discloses the workpieces [42] being provided with a layer which is applied via sputter-CVD process (abstract). It is known that prior to adhering a layer onto a workpiece, to clean/polish/etch in order to provide a superior surface for the deposited layer to adhere too. During this cleaning/polishing/etching, workpiece material will inherently be removed.

With respect to claims 10 and 26, Bergmann et al further discloses that the evaporation crucible [9] contains titanium as the evaporated material (col. 4, lines 55-58). Titanium is well known to be used as an alloy in turbine engine parts as evidenced by www.wikipedia.com (Document X of PTO-892, p.1, filed 8/2/2007).

With respect to claim 11, Bergmann et al discloses an apparatus in fig. 1 having a deposition chamber [2] and workpieces [42], where material is deposited via plasma-chemical reaction for sputtering (i.e. second component) and evaporation (i.e. first component) (col. 2, lines 4-10). The workpieces [42] are conductively attached to a turntable [43], which in turn is attached to a voltage source [52] via a switch [49] (col. 3, lines 50-60; col. 4, lines 23-25). The switch [49] is electroconductively connectable both by a positive pole [50] and a negative pole [51], thus the electrical potential is modulated. Fig. 1 further depicts a sputter target [31], with chamber [2] capable of having several sputter devices [3] (col. 2, lines 45-49). Fig. 1 also depicts a control unit [27] that adjusts and controls voltage sources [36], [21] which is attached to the sputter target [31] and evaporative crucible [9] (col. 3, lines 8-10; col. 4, lines 12-18). The

control unit [27] switches to co-deposit material from the sputter target (i.e. second component) and evaporation crucible (i.e. first component) (col. 5, lines 9-36). Bergmann et al discloses co-depositing material from a crucible (first component) and a sputter target (second component). To sputter, a plasma is formed from a gas inlet [10]. The gas inlet [10] is approximately in-between the crucible [9] and sputter target [31] (fig. 1). Titanium ions are evaporated from the crucible [9] (col. 4, lines 57-58). It is inherent that some of the evaporated titanium ions will be absorbed into the plasma from gas inlet [10]. The plasma, and therefore titanium ions, is then used to sputter from the target [31]. Thus ions from the crucible (first component) [9] are used to sputter the target (second component) [31]. Since the control unit is capable of switching, it is expected that a feedback means is incorporated into the control unit to achieve the switching.

With respect to claim 12, Bergmann et al further discloses the plasma, and thus plasma density, is limited during sputtering by an anode [41] (col. 3, lines 48-49). Since the plasma is limited, it must therefore be monitored. Furthermore since ion current upon the workpieces is related to plasma density, the ion current is limited and thus monitored.

With respect to claim 13, Bergmann et al further discloses an vacuum coating chamber [2] having one sputtering device [3] and a sputter target [31] with the capability to place several other sputtering devices (i.e. a second sputter target) (col. 2, lines 43-50). The sputter target [31], evaporation crucible [9], the bias on the workpieces [42], and all other electrical components are routed through control unit [27] as evidenced via fig. 1. Since Bergmann et al states that an additional sputter device would be provided

in the chamber [2], it is expected that said additional sputter device would also be attached to control unit [27] since it is inherent that a sputter target be biased to properly sputter. Since each deposition device has a separate power source [36], [21] it is also expected that the control unit [27] independently control the bias upon the first and second sputter devices.

With respect to claim 14, Bergmann et al discloses a sputter-CVD process for coating a workpiece [42] in a chamber [2] by a sputter target (i.e. second component) [31] and an evaporation crucible (i.e. first component) [9] (abstract; fig. 1). Bergmann et al further discloses the sputtered and evaporated material being co-deposited during the sputter-CVD coating process (col. 5, lines 26-34). Bergmann et al discloses co-depositing material from a crucible (first component) and a sputter target (second component). To sputter, a plasma is formed from a gas inlet [10]. The gas inlet [10] is approximately in-between the crucible [9] and sputter target [31] (fig. 1). Titanium ions are evaporated from the crucible [9] (col. 4, lines 57-58). It is inherent that some of the evaporated titanium ions will be absorbed into the plasma from gas inlet [10]. The plasma, and therefore titanium ions, is then used to sputter from the target [31]. Thus ions from the crucible (first component) [9] are used to sputter the target (second component) [31]. In addition, Bergmann et al discusses how for coating, the workpieces [42] are conductively attached to a turntable [43], with said turntable attached to a voltage source [52] (col. 3, lines 50-60; col. 4, lines 23-24), whereas the sputter target [31] is attached to a second voltage source [36].

With respect to claim 15, Bergmann et al further discloses that the evaporation crucible (i.e. first component) [9] contains titanium as the evaporated material (col. 4,

lines 55-58), with the sputter target being tungsten in addition to also being of the chemical group VIa (i.e. chromium, molybdenum, and tungsten) (col. 6, lines 15-21).

With respect to claim 16, Bergmann et al further discloses that "optimum layer quality is achieved with a positive bias of approximately 35 volts. At this voltage the current in line [48] to the workpieces is higher by approximately 20% than the current in line [35] to the target [31]" (col. 5, lines 66-68; col. 6, lines 1-2). Since current and voltage re related, it is expected that since the currents are different, the voltages would be as well.

With respect to claim 19, Bergmann et al discloses a sputter-CVD process for coating a workpiece [42] in a chamber [2] by a sputter target (i.e. second component) [31] and an evaporation crucible (i.e. first component) [9] (abstract; fig. 1). The material of the evaporation crucible is deposited via ion-enhanced electron beam physical vapor deposition since Bergmann et al discusses that an electron beam [30] impinges electrons on the titanium [17] inside the evaporation crucible [9], resulting in the titanium heated very strongly so that a high evaporation rate results (col. 4, lines 66-68; col. 5, lines 1-1-2). In addition a low-voltage arc produces argon ions, where the evaporated titanium is ionized by the low-voltage arc and therefore also ionized by the argon ions (col. 4, lines 47-48; col. 5, lines 2-3). Bergmann et al further discloses the sputtered and evaporated material being co-deposited during the sputter-CVD coating process (col. 5, lines 26-34). Bergmann et al discloses co-depositing material from a crucible (first component) and a sputter target (second component). To sputter, a plasma is formed from a gas inlet [10]. The gas inlet [10] is approximately in-between the crucible [9] and sputter target [31] (fig. 1). Titanium ions are evaporated from the crucible [9] (col. 4,

lines 57-58). It is inherent that some of the evaporated titanium ions will be absorbed into the plasma from gas inlet [10]. The plasma, and therefore titanium ions, is then used to sputter from the target [31]. Thus ions from the crucible (first component) [9] are used to sputter the target (second component) [31].

With respect to claims 21 and 22, Bergmann et al further depicts in fig. 1 the sputter target having a first (i.e. top) surface facing the workpieces [42] along a flowpath of the first component as stated in the rejection of claim 3, and a second (i.e. bottom) surface facing away from said workpieces. Anode [41] and insulating ring [33] function as a sputter target sleeve which is positioned to protect the second surface from the plasma formed during sputtering and associated vaporization of the first component.

5. Claims 1 and 27 are rejected under 35 U.S.C. 102(b) as being anticipated by Zabinski et al (US H001933).

With respect to claims 1 and 27, Zabinski et al discloses a system (i.e. deposition chamber) [10] and method for simultaneous or sequential magnetron sputtering [21] and pulsed laser plasma deposition [24] (abstract). Zabinski et al further discloses the laser generator [24] ablates (i.e. evaporates) target [28] to deposit a film upon a substrate (col. 3, lines 1-9). Zabinski et al discloses simultaneously depositing material from an evaporation target (first component) and a sputter target (second component). To sputter, a plasma is formed from a gas inlet [18]. The gas inlet [18] injects the inert gas [19] and reactive gas [20] past the evaporation target [28] (fig. 1). Ions are evaporated from the evaporation target [28], with it inherent that some of the evaporated ions will be absorbed into gas as said gas travels to the magnetron source [21] to become a plasma. The plasma, and therefore ions, is then used to sputter from the target of the

magnetron source. Thus ions from the evaporated target (first component) [28] are used to sputter the target of the magnetron source (second component) [21]. Materials which may be sputtered or ablated are titanium, vanadium, aluminum, zirconium, molybdenum, tungsten (col. 2, lines 62-67; col. 3, lines 8-18). Although the substrate is placed on a rotatable table [15], it is not specifically stated whether the substrate is biased. However it is known in the art to bias a substrate on a rotatable table where tungsten and titanium are sputtered and evaporated, respectively, onto a substrate to attract ions from the sputter target to the substrate as evidenced by Bergmann et al (US Patent No. 4,992,153; fig. 1, [23], [42], [31], [9]; col. 3, lines 33-35; col. 4, lines 57-58; col. 5, lines 60-67). Zabinski et al also discusses evacuating the chamber [11] to about 10^{-9} to 10^{-10} torr (col. 2, lines 38-41).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Zabinski et al (US H001933) as applied to claim 1 above, and further in view of Lederich et al (US Patent No. 4,415,375).

With respect to claim 6, the reference is cited as discussed for claim 1. However Zabinski et al is limited in that while it is disclosed to deposit a compound of titanium,

aluminum, vanadium, molybdenum, zirconium, and their composites, a specific deposition material is not suggested.

Lederich et al teaches a transient titanium alloys having a composition of Ti-8Al-1Mo-1V (abstract). Lederich et al also depicts in fig. 1 a disk (i.e. target) composed of Ti-8Al-1Mo-1V. Lederich et al cites the advantage of this alloy as parts and structures formed and restored from said alloy retain the strength and structural integrity of the base alloy.

It would have been obvious to one of ordinary skill in the art to use form a transient titanium alloy of Lederich et al from the deposition materials in Zabinski et al to gain the advantages of retention of base alloy strength and structural integrity.

8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bergmann et al (US Patent No. 4,992,153) as applied to claim 7 above, and further in view of Ray et al (US Patent No. 6,986,381).

With respect to claim 8, the reference is cited as discussed for claim 7. However Bergmann et al is limited in that while there must exist some bond strength between the substrate and the coating, no specific value is suggested.

Ray et al teaches metallic alloys with improved surface quality, structural integrity and mechanical properties fabricated in refractory metals (abstract) such as nickel, cobalt, and iron base superalloys, stainless steel alloys, titanium alloys, titanium aluminide alloys, zirconium alloys, and zirconium aluminide alloys (col. 5, lines 55-62). Ray et al also provides a more detailed list of the components in a coating in Table 3 (col. 15). A flexural strength (i.e. bend strength) of 40,000 psi (40 ksi) to 75,000 psi (75 ksi) is also described (col. 6, lines 32-35), with these alloys typically having a yield

strength (i.e. bond strength) in excess of 100 ksi (col. 2, lines 27-30). Ray et al cites the advantage of using refractory metal alloys due to their hard and wear resistant coating properties (col. 1, lines 10-24).

It would have been obvious to one of ordinary skill in the art to apply the refractory metal alloy properties taught in Ray et al for Bergmann et al to gain the advantages of a superior hard and wear resistant coating.

It has been held that in the case where claimed ranges "overlap or lie inside ranges disclosed by the prior art" a *prima facie* case of obviousness exists. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976).

9. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bergmann et al (US Patent No. 4,992,153) and Ray et al (US Patent No. 6,986,381) as applied to claim 8 above, and further in view of Gabriele et al (US Patent No. 6,875,318).

With respect to claim 9, the references are cited as discussed for claim 8. It is expected that the workpiece be larger than metallic coating. However Bergmann et al is limited in that the thickness layer of metal is specified and multiple layers are suggested, it is not specified as to an exact thickness for all layers.

Gabriele et al teaches a method of coating a substrate by leveling the surface of the substrate by physical vapor deposition (PVD) of a metallic coating (abstract), in addition to ion beam, e-beam evaporation, and arc deposition also suitable deposition methods (col. 4, lines 59-66). Gabriele et al further teaches suitable metallic materials for deposition as titanium, zirconium, chromium, gold, silver, platinum, copper, aluminum, tin, molybdenum, boron, graphite, tantalum, tungsten, hafnium, and

combinations thereof, with possible alloys being titanium-zirconium, titanium-aluminum-vanadium-nickel-chrome-copper-silver, and aluminum titanium (col. 5, lines 60-67). A thickness of the metallic layer of from about 0.1 millimeter to about 3 millimeter is stated (col. 2, lines 41-45).

It has been held that obviousness may sometimes be based on the common knowledge of persons skilled in the art without relying on a specific suggestion in a particular reference. *In re Bozak*, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969). Since both references teach depositing, via sputtering, combinations of tungsten and titanium in specified thicknesses of the alloy layers, it would have been obvious to one of ordinary skill in the art to deposit the said combination of tungsten and titanium from 10 nm to 2 mm as this merely represents a user inputted variable.

10. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bergmann et al (US Patent No. 4,992,153) as applied to claim 14 above, and further in view of Gruen (US Patent No. 5,015,493).

With respect to claim 17, the reference is cited as discussed for claim 14. Bergmann et al further depicts in fig. 1 a first bias voltage switch [49] attached to a first power source [52] and a second bias voltage switch [37] attached to a second power source [36], where the switches [37], [49] modulate the power flow. The power sources are DC power sources (col. 5, lines 60-66; col. 6, lines3-5). It is known that a magnitude and duty cycle are associated with each power source [36], [52]. Bergmann et al also states that approximately simultaneously with the changeover of switch [37] to position [b], switch [49] is brought into position [a] (col. 5, lines 9-20). Since the switches are switched to different positions, the power is modulated differently resulting in distinct

magnitude and duty cycles. However Bergmann et al is limited in that in that it is not suggested to have the DC power sources be pulsed.

Gruen teaches a process and apparatus for coating conductive workpieces by ionized vapors (abstract), where the apparatus is useful for PVD processes like ion plating or sputtering and target evaporation by electron beam or arc (col. 2, lines 54-56). Figs. 1 and 2 depict a sputtering source [3] and an evaporation source [11], respectively, with a conductive workpiece [5]. Also depicted in figs. 1 and 2 is a pulse power supply [9] attached to the workpiece [5] and either sputter source [3] or evaporation source [11] via leads [7], [8]. The pulse power supply is a DC power supply (col. 3, lines 34-35). Gruen cites the advantage of pulsed DC power as making it possible to coat surface structures of workpieces having slots and bores (col. 2, lines 3-11).

It would have been obvious to one of ordinary skill in the art to use the DC pulse power supply of Gruen for the DC power supply of Bergmann et al to gain the advantage making it possible to coat surface structures of workpieces having slots and bores.

11. Claims 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bergmann et al (US Patent No. 4,992,153) as applied to claims 14 and 19 above, and further in view of Nulman et al (US Patent No. 6,231,725).

With respect to claims 18 and 20, the reference is cited as discussed for claims 14 and 19. However Bergmann et al is limited in that while it is discussed to have the evaporation crucible contain a single source (i.e. ingot) of titanium and have one or

more sputter devices present in the chamber, it is not suggested to compose the sputter devices of different deposition materials or to bias the targets differently.

Nulman et al teaches an apparatus for sputtering material onto a workpiece with the aid of a plasma (abstract), where figs. 2 and 3 depict a biased first target [110], a biased second target [500], and a biased workpiece [112]. Nulman et al also adds that both targets and workpiece can be biased with distinct DC power sources [111], [121] [400] as depicted in fig. 3 (col. 3, lines 61-63; col. 4, lines 15-16 and lines 36-39). Furthermore Nulman et al states that the first target and second target may be composed of different materials (col. 8, lines 8-12). Nulman et al cites the advantage of this design as increasing deposition uniformity (col. 3, lines 1-6).

It would have been obvious to one of ordinary skill in the art to use multiple compositional sputter targets using different voltage biases taught in Nulman et al for the sputter device of Bergmann et al to gain the advantage of increased deposition uniformity.

12. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bergmann et al (US Patent No. 4,992,153) as applied to claim 21, and further in view of Nulman et al (US Patent No. 6,231,725).

With respect to claim 23, the reference is cited as discussed for claim 21. However Bergmann et al is limited in that while it is discussed to have a sputter target inside a sputter target sleeve, it is not disclosed to have a second sputter target of distinct composition inside the sputter target sleeve.

Nulman et al teaches an apparatus for sputtering material onto a workpiece with the aid of a plasma (abstract), where figs. 2 and 3 depict a biased first target [110], a

biased second target [500], and a biased workpiece [112]. Nulman et al also adds that both targets and workpiece can be biased with distinct DC power sources [111], [121] [400] as depicted in fig. 3 (col. 3, lines 61-63; col. 4, lines 15-16 and lines 36-39). Furthermore Nulman et al states that the first target and second target may be composed of different materials (col. 8, lines 8-12). Nulman et al cites the advantage of this design as increasing deposition uniformity (col. 3, lines 1-6).

It would have been obvious to one of ordinary skill in the art to stack multiple compositional sputter targets taught in Nulman et al inside the sputter target sleeve in Bergmann et al to gain the advantage of increased deposition uniformity.

Response to Arguments

13. Applicant's arguments filed 4/30/2008 have been fully considered but they are not persuasive.

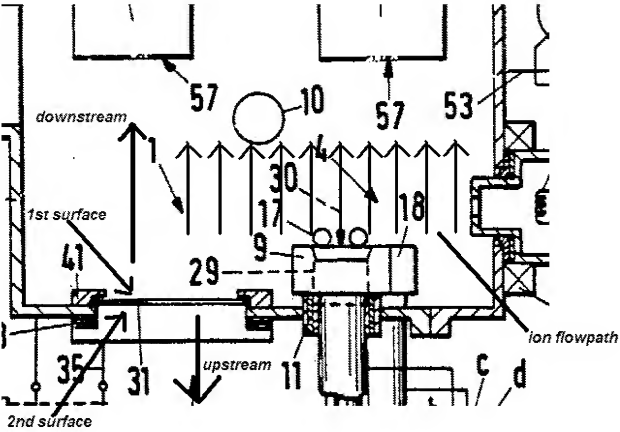
102 Rejections

14. On p. 7-9, the Applicant argues that the Examiner has applied Bergmann et al in a confusing manner. The Applicant further argues that Bergmann et al, and thus the Office Action, fails to teach the ions of a first component are used to sputter the second component. The Applicant further argues that "a total vitiation" has been used of Bergmann et al in response to the claim 3 limitation of encircling, with the Applicant also arguing that the Office Action has not identified the claimed limitations of the flowpath and a downstream and upstream directions. The Applicant further argues Bergmann et

al fails to disclose depositing Ti alloy on turbine engine parts. The Applicant further argues that the rejection of claim 15 fails to encompass aluminum or vanadium.

The Examiner respectfully disagrees. The Examiner has stated that the evaporation crucible is a first component and the sputter target is a second component. The Examiner is befuddled as to how this is either “oddly-worded” or “unclear and insufficiently articulated”. With regards to the ions of the first component used to sputter the second component, the Examiner submits the following explanation: Bergmann et al discloses co-depositing material from a crucible (first component) and a sputter target (second component). To sputter, a plasma is formed from a gas inlet [10]. The gas inlet [10] is approximately in-between the crucible [9] and sputter target [31] (fig. 1). Titanium ions are evaporated from the crucible [9] (col. 4, lines 57-58). It is inherent that some of the evaporated titanium ions will be absorbed into the plasma from gas inlet [10]. The plasma, and therefore titanium ions, is then used to sputter from the target [31]. Thus ions from the crucible (first component) [9] are used to sputter the target (second component) [31]. With regards to depositing Ti alloy on turbine engine parts, Bergmann et al teaches depositing a Ti from a crucible [9] and tungsten carbide from a sputter target [31] (col. 3, lines 33-35; col. 4, lines 57-58), thus a Ti alloy is being deposited onto a workpiece. The claimed limitation of the workpiece being a turbine engine part is directed towards intended use. With regards to Bergmann et al failing to encompass aluminum or vanadium, the Examiner submits the following: Bergmann et al discloses a tungsten carbide sputter target (col. 3, lines 33-35), where the sputtering material can also be boron, carbon, silicon, and metals of groups IVb, Vb, VIb, VIII, or their alloys in addition to groups IVa, Va, Via (col. 6, lines 15-21). With regards to ion flowpath and

downstream and upstream directions, the Examiner submits the following drawing of Bergmann et al fig. 1:



103 Rejections

15. All other arguments are directed towards the primary reference of Bergmann et al and have been addressed accordingly.

Information Disclosure Statement

16. The Applicant is kindly reminded of the duty to disclose information relevant to patentability according to MPEP 704.12(a). The Examiner submits the following reference of the Applicant's (Anatoly Kuzmichev) as being relevant to the present application for teaching a dual-magnetron (i.e. two deposition sources) sputtering for the deposition of titanium.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Band whose telephone number is (571) 272-9815. The examiner can normally be reached on Mon-Fri, 8am-4pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Alexa Neckel can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

18. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/M. B./

Examiner, Art Unit 1795

/Alexa D. Neckel/

Supervisory Patent Examiner, Art Unit 1795